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Instruments of Communicative Skill According to 4C's In Trigonometric Ratio

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ABSTRACT
The purpose of this research is to develop mathematics learning instruments in the form of communicative skills-based modules that conform to 4C's criteria on trigonometric ratio. This research uses Research and Development methods adapted in the development of the ADDIE model. The subjects of this study were class X learners at Madinatul 'Ulum Jombang High School for the academic year 2020/2021. As for data collection techniques are interviews and questionnaires. Researchers designed a learning instrument in the form of communicative-based modules. The results of this study showed that (1) Assessment of the validity of learning instruments in the form of communicative-based modules by two material experts received a percentage of 94% and 75.5% with a very valid and quite valid category. (2) Assessment of the practicality of learning instruments in the form of communicative-based modules by learners gets a percentage of 82.07% with a very practical category. Based on the results of the above research, researchers concluded that learning instruments in the form of communicative-based modules are declared valid and practical based on the assessment of experts and learners, so it is worth using in mathematical learning.

Keywords: *Development, Mathematics Module, Communicative Skills.*

INTRODUCTION

Mathematics is one of the subjects that have an important role in education. In addition to being able to develop logical, rational, and critical thinking also provides skills to children to be able to solve problems in everyday life by using mathematics (Khotimah & Mahmudah, 2021). Therefore, educators are required to be able to adjust, choose, and blend the right learning model in every math learning. One of the efforts to answer the problem is by developing teaching materials as one of the learning instruments (Nasrulloh et al., 2021).

One of the teaching materials that can be used to help the learning process is the module. According to (Daryanto, 2013) the module is one form of teaching material that is packaged whole and systematically, it contains a set of learning experiences that are planned and designed to help learners master learning materials, and evaluation. In the field of science in mathematics subjects are still considered difficult by most learners. One of the mathematical materials that can be developed is the trigonometric ratio. Some research on the development of trigonometric ratio modules obtained positive results (Liana, 2018). However, research that also looks at mathematical communication skills in trigonometric ratios has not been done. Meanwhile, research related to mathematical communication still has unsatisfactory results (Sari, 2018).

Based on observations made by researchers at Madinatul 'Ulum Jombang High School in this time of emigrant, the process of learning activities carried out by educators starts from explaining the material, giving examples, then providing problem exercises from LKS (student worksheets) or package books through WhatsApp (WA). This makes learners passive, at this time educators are required to be able to be more innovative in learning mathematics, an educator should be able to make learners less likely to become bored and saturated. Student communication must be improved, familiarize learners to openly issue mathematical ideas on the topic studied and get used to asking questions and discussing with friends, even though it is currently an online or online learning system.

The development of mathematical communication will hinder learners in solving mathematical problems (Nasrulloh & Umardiyah, 2020). This is in line with the skills that must be possessed by every

learner in the 21st century 4C's namely: Communication, Collaboration, Critical Thinking, and Creativity. In this regard, it is necessary to develop teaching materials in the form of communicative modules according to 4C's criteria on trigonometric ratio materials.

METHOD

According to (Nana, 2005) research and development is a process or step to develop a new product or perfect an existing product, which can be accounted for. This research is a research and development study with the ADDIE model. This research was conducted in grade X high school even semester. The development steps in this model are: (1) Analysis; (2) Design; (3) Development; (4) Implementation; (5) Evaluation.

The analysis stage used by researchers there is three stages, namely the curriculum analysis stage, the analysis of the characteristics of High School learners, and the analysis of module development. Curriculum analysis is carried out by reviewing the curriculum used by the school, namely the 2013 curriculum. The things analyzed include basic competencies and indicators that must be achieved by learners on the subject of discussion of trigonometric ratios. Character analysis of learners is done by conducting interviews with math teachers at the school and observations during classroom learning activities. The analysis of module development is carried out by determining the basic competencies and indicators of achievement of trigonometric ratio material competence, as well as analyzing communicative skill indicators to be applied, as well as reviewing the aspects that need to be considered in the development of modules. So that the results of the modules developed into decent and good modules.

There are three steps in the design stage, namely: (1) Prepare references in the form of books, files, related to trigonometric ratio material; (2) Design modules by determining and composing module components, compiling materials, exercises and assignments, background creation, module covers and layouts; (3) Develop the module's feasibility assessment instrument, but before use in the assessment of the module, the assessment instrument is validated first.

The development stage is the product realization stage. First, arrange the parts in the module that contain the cover, contents of the module (table of contents, glossary, concept map, instructions contained in the module, material, problem examples, and answer keys). Second, validate or test the feasibility of modules by experts where criticism and suggestions from validators are further used for the improvement of the developed module. Third, revise stage I and must be adjusted to the advice of competent experts in their fields.

In the implementation phase, field trials are conducted using validated instruments. This trial is carried out on a limited basis by taking a sample of one class in class X. Further-more the evaluation stage, at this stage the module analysis is carried out, whether the module developed can be said to be feasible, valid, and practical. And revise the product phase II, based on the data of the results of the trials that have been done.

RESULT AND DISCUSSION

The type of research conducted by researchers is development research with the ADDIE model (Analysis, Design, Develop, Implement, Evaluation). The product developed is a mathematical learning instrument in the form of modules with ratio materials that correspond to communicative skill indicators in 4C's and curriculum 2013.

Result

The results of the interview were conducted by researchers at Madinatul ' Ulum Jombang High School in the 2021-2022 school year. In this time, the teaching and learning process is carried out by educators starting from explaining the material, giving examples, then providing problem training from LKS (student worksheets) or package books through WhatsApp (WA). This makes learners more passive and the enthusiasm of learners when participating in the mathematics learning process is lower because they feel bored and saturated. Most of the X-class learners at Madinatul' Ulum Jombang High School do not like math lessons so the grades they achieve have largely not reached the set math KKM. Madinatul 'Ulum Jombang High School has used the 2013 curriculum without exception.

The analysis stage of module development is carried out by determining the basic competencies and indicators of achievement of trigonometric ratio material competence, as well as analyzing communicative skill indicators to be applied. Furthermore, realize the 4C's indicator (communicative

skill) with the basic competence of class X trigonometric ratio material that has been aligned with the 2013 curriculum.

Table 1. Skill Indicator 4C's (Communicative Skill) Subject matter Trigonometric Ratio

Basic Competencies: 3.7 Describes the ratio or ratio of trigonometry (sinus, cosine, tangent, cosecan, secan, and cotangen) in the right triangle	
4C's	**Indicators**
Communicative skill	a. Find the concept of resizing the angle according to the provisions (degrees to radians and vice versa) b. Find a comparison of sinus, cosinus, tangen, cosecan, secan, and cotangen c. Present the application of angles and trigonometric ratios to the right triangle that has been made in writing
Basic Competencies**:** 4.7 Resolve contextual problems related to trigonometric ratios (sinus, cosinus, tangen, cosecan, secan, and cotangen) in the right triangle.	
Communicative skill	a. Presents real problems into mathematical symbols to find the ratio of sinus, cosinus, tangen, cosecan, secan, and cotangen b. Presents the use of the concept of revival to change the angular size according to the provisions (degrees to radians and vice versa).

This design stage includes the creation of modules with the subject matter of trigonometric ratio as the development of mathematical teaching materials that researchers do. First, preparing references in this stage is done is collecting references both in the form of books, files, related to trigonometric ratio material, and accordance with curriculum 2013. Second, design modules by composing the material presented in typed modules with new roman times format with font size 12, 18, and 20, using Microsoft Word2016, using A4 paper (21 X 29.7 cm). Third, draw up a module feasibility assessment instrument in the form of a checklist for material experts and learners. The material expert validator is a lecturer at K.H. Abdul Wahab Hasbullah University Fitri Umardiyah's, M.Pd. and teacher of mathematics at Madinatul 'Ulum High School, Emil Istiqomah's, S.Pd.

This development stage is the stage of product realization, namely the manufacture of high school's class X mathematics modules including the determination of material content, validation and production. The content of the material is based on communicative skill indicators at 4C's which are realized with the basic competence of the trigonometric ratio material. So that the module is produced that is interesting and communicative. Here are the views of the modules that have been worked on by researchers.

Figure 1. Module Cover View

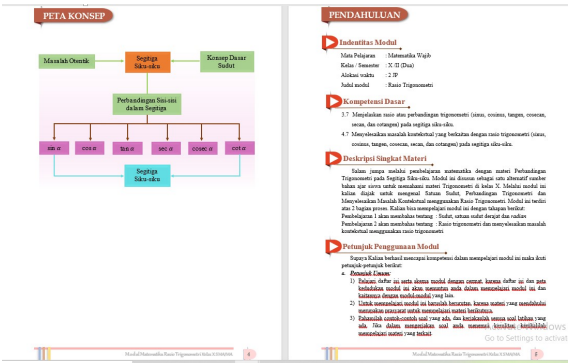

Figure 2. Concept Map and Introduction View

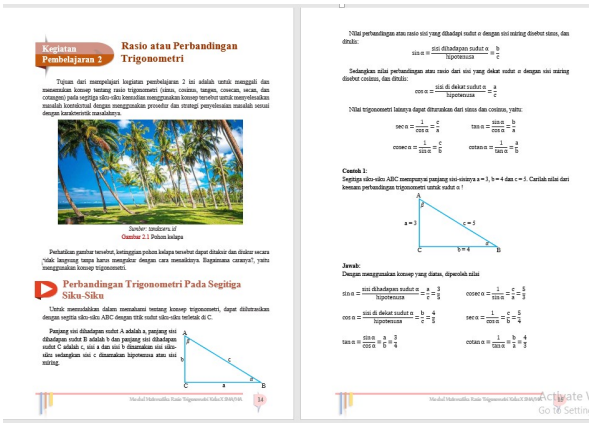

Figure 3. Material View on Module

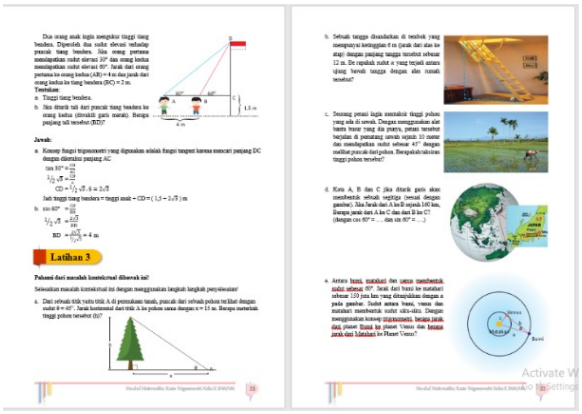

Figure 4. Problem Training View on Modules

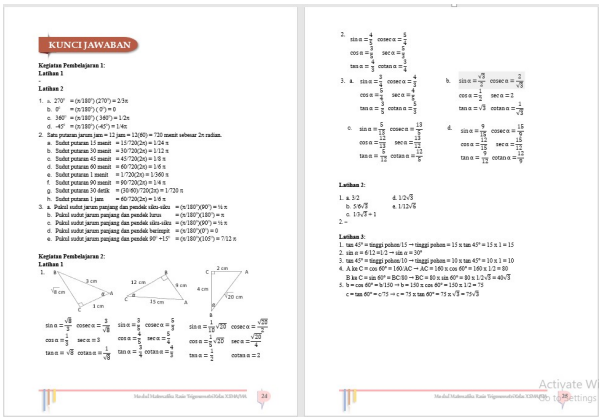

Figure 5. Answer Key View

The next module goes through the validation or assessment stage of experts. At this stage, the

module is validated by 2 experts. Then to find out the category of validity of the module, the percentage value of the validity of the module is adjusted to the validity table that has been assigned.

Table 2. Validator Assessment Data

No	Statement	V1	V2
1	Preliminary Aspects	15	12
2	Content Aspects	35	25
3	Evaluation Aspects	30	27
4	Closing Aspects	5	4
Total		85	68
Percentage Validity		94%	75,5%

Tabel 3. Module Validity Category

No.	Validation Criteria	Level of Validity
1.	81,0% - 100,0%	Highly valid, can be used without revision
2.	61,0% - 80,9%	Valid enough, can be used but needs revision

Tabel 4. Validator Comments

Validator	Commentary
1	Worth using without revision
2	For examples of problems and problems directed to AKM (added)

Description:
V1: validator 1 is Fitri Umardiyah, M.Pd.
V2: validator 2 is Emil Istiqomah, S.Pd.

Based on tables 3 and 4 the validation results of the first validator of the module are worth using without revision, so the module can already be used as learning material. The assessment results of the validator are worth using but with revision. From the comments given the module needs to be added examples of questions and exercises about AKM (Minimum Competency). Based on the assessments that have been obtained, it is known that the development of module-shaped learning instruments has been feasible and communicative-based. So that the module can enter the next stage, namely implement (implementation), the stage where to see the practicality value of the module.

This stage is a product trial. The revised product was tested on students of class X of Madinatul 'Ulum Jombang High School 2021/2022,with21 students. Data from the recapitulation of the assessment of the response of learners can be seen in the following table.

Tabel 5. Results of Student Assessment

No	Assessment Indicator	Number of Values	Percentage
1	Ease of Understanding the Material	88	83,81%
2	Presentation of modules in accordance communicative skill indicators at 4C's	683	81,31%
3	Language	259	82,22%
4	Interest	255	80,95%
Total		1285	328.29%
Percentage of practicality			82,07%

Tabel 6. Practicality Assessment Criteria

No.	Practicality Criteria	Level of Validity
1.	81,0% - 100,0%	Very Practical

Evaluation is obtained from the results of the student's response questionnaire after studying trigonometric ratio material using communicative-based module learning media. The results of the response questionnaire have been outlined in table 5, the percentage value of the practicality of the module is adjusted to the predetermined practicality table. It can be concluded that the modules developed by researchers are feasible and practically used in the learning process.

Discussion

The characteristic of this module is communicative-based skills. Where the content in the module makes learners open to issue mathematical ideas on the topic studied and makes learners ask questions and discuss with friends, even though currently the learning system is online. This mathematics module is structured based on the KI and KD mathematics curriculum 2013 which is realized with communicative skill indicators at 4C's.

The final result of the design of a communicative skill-based mathematics module on trigonometric ratio material, starting from the cover of the module presented as the content contained in the module, the module cover is tried as much as possible to represent the title of the module. The introductory section includes module descriptions, module usage instructions, concept maps, and basic competencies to be achieved. The material in this module discusses the class X trigonometric ratio whose presentation is adapted to the 2013 curriculum and communicative skill indicators at 4C's. In each introduction to the sub-chapter, this module presents an introduction in the form of an overview of real-life problems that can be solved by trigonometric ratio. In addition, at the end of each sub-chapter is also given examples of problems accompanied by discussions and training questions to hone the understanding of learners. The closing part of this communicative skill-based mathematics module consists of a summary of the material to be filled by learners, key answers to all practice questions, and a bibliography. This module has gone through the validation stages by several validators. After obtaining an assessment with valid criteria with a slight revision, this module is then tested on learners to see the practical value of the module. Thus, the final result of this product is a valid and practical communicative skill-based mathematics module so that it is suitable for use in learning activities.

CONCLUSION

After the research and development process is implemented, the conclusion that can be taken is the result of validation by expert validators (1 lecturer and 1 teacher), communicative skill-based mathematics modules developed have been in a good category, namely 94% and 75.5% in the assessment range of 0% to 100%. The value indicates that the developed module has been worth using with little revision. The preparation of communicative skill-based mathematics modules on high school's class X trigonometric ratio material was developed using the ADDIE version development model. Based on the results of filling out the response questionnaire by learners, the Matematica module gets a practicality value in the good category, which is 82.07% in the assessment range of 0% to 100%. That is, the modules developed are practical for use in learning.

As is the case with other studies of course this study does not escape limitations. The limitation of the first study is that it only measures validity and practicality. The limitations of both sampling methods are commonly used in many studies today. The limitations of this study provide opportunities for future research and also allow other researchers to continue this research.

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